

## Equine Nutrition Research

Who conducts equine nutrition research, what are they doing, and how is it used? Part 1 of an important series on equine health and nutrition.

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Where do feed companies get the information they use to formulate horse feeding products? Equine nutrition research is conducted by universities and institutions around the world. The greatest effort is in Animal Science Departments in the United States and Canada. The second largest effort is in Colleges of Veterinary Medicine, however, their predominant effort is in nutritional physiology. The third effort is in institutions in Europe, Australia, and Japan. The fourth contributor are the private research facilities and company research programs. Lets look at some examples of each. foal grazing

The following University Departments of Animal Sciences have active equine nutrition research programs:

- University of Florida - Nutritional requirements of the mare and growing horse, effect of nutrient intake on the working horse, digestibility of forages, and feeding management systems.
- Texas A&M University - Nutritional requirements of the growing horse, digestibility of various feeds, factors influencing development of horses in training.
- University of Kentucky - Influence of nutrient intake on performance.
- Colorado State University - Influence of mineral intake on skeletal development.
- Rutgers University - Nutritional needs of geriatric horses, influence of nutrition on working horses
- West Texas A&M University - Factors influencing digestion in the horse.
- Iowa State University - Use of feed ingredients.
- Virginia Polytechnic Institute and State University - Factors influencing performance, influence of exercise on nutrient needs of horses and supplemental nutrient needs of pastured horses.
- Virginia Intermount College - Amino acid needs of horses.
- Oklahoma State University - Diet and exercise effects on skeletal development.
- Auburn University - Horse management systems. The following International Institutions are doing equine nutrition research:
  - Institute of Animal Nutrition, School of Veterinary Medicine, Hanover, Germany
  - ENESAD, Dijon, France - Digestion in the horse.
  - EVIALIS, Saint-Nolff, France - Digestion in the horse.
  - University of Wales Aberystwyth - Digestion in the horse.
  - Japanese Racing Association - Nutritional needs and feeding

management of the growing horse and the horse in training.

Where is the research published? The proof of the quality of the work is the publishing of papers in scientific journals. These articles are reviewed by other scientists to ensure that the experimental design, conduct of the study, statistical analyses of the data and presentation meet scientific standards. Articles published in popular magazines are only authenticated when they are based on published, refereed research. Preliminary results are also presented at scientific meetings. These papers are published as abstracts in the meeting proceedings and serve as a vehicle for keeping up with the latest work. Some of the most popular feed bag and bucket journals and meetings include:

#### Journals

- Journal of Animal Science
- Journal of Equine Veterinary Science
- Journal of Equine Veterinary Research
- Journal of Nutrition

#### Proceedings

- Equine Nutrition and Physiology Symposium
- Annual Meeting American Association of Animal Science
- International Congress of Exercise Physiology
- Annual Meeting of the Equine Veterinary Medical Association

#### Current Research

The 18th Equine Nutrition and Physiology Symposium was held June 4-7, 2003. Over 250 scientists from around the world gathered to discuss the latest equine research. There were 33 oral presentations and 12 posters on equine nutrition, 11 oral presentations and four posters on exercise physiology, 10 oral presentations and four posters on reproduction, and 20 oral presentations and nine posters on production/management. I will group some of the research by subject matter and summarize the results.

#### Nutrition of the growing horse

Michigan state workers used 24 weanlings to evaluate the digestibility of three diets, a high concentrate (HC) diet (70 percent concentrate and 30 percent hay), an equal (EQ) diet (50 percent concentrate 50 percent hay), and a low concentrate (LC) diet (70 percent hay and 30 percent concentrate.). The hay was half alfalfa and half timothy. The digestion trial was conducted at 5 and at 8 months of age. There was no difference in feed intake with animals on all three diets consuming 28 to 29 grams of feed/kilogram of bodyweight daily. The HC foals digested protein and ADF with greater efficiency than the EQ or LC foals. Energy digestibility decreased as the animals aged (Turcott et al., 2003).

West Texas A&M University reported that yearlings fed organic Cu and Zn had increased mineral retention when compared to yearlings fed the same level of inorganic minerals (Miller et al., 2003). However, they were unable to demonstrate any effect of the organic minerals on bone metabolism or bone mineral content (Baker et al., 2003).

Growth rates are often suggested as a major cause of osteochondrosis (OC) in growing horses. German workers followed 629 Hanoverian Dr. Edgar Ott Warmblood foals from the birth to the 10th month of age. OC was detected at one or more sites in 226 foals. Sex, birth month, level of nutrient intake, body weights and withers heights were not different between OC-affected and OC-unaffected foals. Some effect of weight on location of lesions was detected (Vervuert, et al., 2003). Nutrient levels varied considerably between farms yet there were OC and non-OC animals on all nutrient combinations (Coenen et al., 2003).

The University of Florida reported on a yearling study with 30 Thoroughbred and Quarter Horses. Half of the yearlings were confined to dry lot paddocks and fed coastal bermudagrass hay, and half had access to a bahiagrass pasture. Both groups were fed the same concentrate, and the calculated nutrient intake for both groups was very similar. The pasture-fed yearlings had greater weight gain ( $P=0.02$ ) and heart girth gain ( $P=0.04$ ) than the dry lot yearlings. From 56 days to 112 days of the trial, the pasture-fed yearlings had greater bone mineral deposition ( $P=0.02$ ) than the dry lot-fed yearlings (Stephens et al., 2003).

The University of Florida also reported on the effect of adding fat to diets of young horses. Thirteen Thoroughbred and Quarter Horse weanlings were used in a 112-day trial to evaluate the effect of a fat-added concentrate on growth and development. Half of the foals were fed a conventional concentrate (70 percent) and coastal bermudagrass hay (30 percent). The other foals were fed a similar concentrate containing 3 percent added corn oil, which was fed at 50 percent and hay was fed at 50 percent.

Growth response on both diets was similar and not statistically different. Bone mineral deposition was also similar. Results suggest that high-energy concentrates (fat added) can give similar growth responses to more conventional feeding programs (Ott and Kivifield, 2003).

These research projects provide information on alternative feeding programs and their effect on growth and development of young horses. Pasture seems to be a better way of providing forage to young horses than feeding them in dry lot, however, we do not know for sure whether

the response is due to the nutrients provided by the pasture or the added exercise the horses receive in that type of housing system. Future research will clarify the nutrient needs and exercise needs of the growing horses for optimal skeletal development.

Dr. Ott's intense focus on equine nutrition research around the world will be continued in the next issue of ec magazine, available this winter at your local Seminole dealer